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Epidemiologic Notes and Reports

Health Hazards Associated with Elevated Levels of Indoor Radon — Pennsylvania

As a part of the safety program at the Limerick Nuclear Power Plant in Pennsylvania, personnel entering the plant must pass through a radiation monitoring area. In December 1984, the monitoring device detected an abnormally high level of radiation in one construction worker. When an investigation was made to determine how and where this worker was being exposed to excessive radiation, investigators found that the air in the man's home contained extremely high levels of "radon daughters," the short-lived decay products of radon-222. Radon is an inert, radioactive gas formed in the decay chain of uranium-238. For each year the worker and his family lived in this house, they were exposed to over 50 times the annual occupational limit of exposure for uranium miners. The family relocated until remedial actions to lower the indoor radon levels could be completed.

As a result of this incident, in January 1985 state officials in Pennsylvania began a sampling program in which over 2,000 homes around the construction worker's house were examined. The homes are in an area of natural uranium deposits. Approximately 40% of the homes had radon levels exceeding the U.S. Environmental Protection Agency (EPA) guideline for indoor radon of 0.02 "working levels." A working level is a measure of radon daughter concentrations and is defined as any combination of radon daughters in 1 liter of air that results in 1.3×10^5 million electron volts of potential alpha energy. About 7% of the homes tested had radon levels at or above the 0.1 working level. If residents in these homes spend 75% of their time indoors exposed to 0.1 working level, their yearly exposure would equal 4 working level months, the annual occupational limit of exposure. A working level month is a measure of exposure and is a function of the time of exposure and the level of radon daughters, given in working levels.

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Editorial Note: The elevated radon levels near the eastern border of Pennsylvania are associated with natural uranium deposits that extend into northern New Jersey and southern New York. Since similar geologic deposits are found throughout the country, the elevated radon levels in Pennsylvania may indicate a much broader national problem. Radon enters a building

Indoor Radon – Continued

through cracks, such as those in a basement floor, and through openings around pipes and wiring. Once inside, the radon builds up in the air, particularly in poorly ventilated houses. As radon daughters are formed, they attach to airborne particulates. When inhaled, these particulates can deliver a substantial dose of radiation to the bronchial epithelium.

No exposure limit has been established for indoor levels of radon from natural sources; however, EPA is now developing guidelines that will define action levels concerning houses with high concentrations of radon and is developing and evaluating mitigation strategies.

Exposure to radon daughters increases a person's lifetime risk of lung cancer. The risk rises in direct relationship with the length of exposure and with radon daughter levels.

The two risk estimates in Table 1 are derived from studies of uranium miners and have been extrapolated from relatively high occupational exposures to environmental levels. The highest lifetime risk calculated from studies of uranium miners is 7.3×10^{-4} deaths per working level month, and the lowest generally accepted risk is 3.0×10^{-4} deaths per working level month (*1,2*). These estimates are for the general population, including smokers. The risks for nonsmokers are approximately six times less than those given in the upper portion of the table (*1*).

Each year, approximately 5,000-30,000 deaths may be attributed to background levels of indoor radon. The health threat from radon can be addressed by identifying geographic areas that could produce elevated levels of indoor radon, developing strategies to reduce exposure, conducting research on effective remedial measures to be taken in buildings, and providing educational programs for health officials and the public. Changes in usage patterns of high-radon areas in a home, such as the basement, and the control of future construction in geographic areas high in uranium deposits can reduce exposure. Effective remedial measures for individual dwellings can also be used to lower radon exposure. Research in these areas should be coordinated with other agencies active in this field. The educational programs can be used to inform health officials and the public about the health threat from radon and about associated risk factors, such as smoking.

References

1. National Research Council. The effects on populations of exposure to low levels of ionizing radiation. Washington, D.C.: National Academy Press, 1980.
2. International Commission on Radiological Protection. Limits for intakes of radionuclides by workers. ICRP report no. 32, part 3, 1981.

TABLE 1. Risk (percent) of persons dying from lung cancer related to radon*

Deaths per working level month	Years of exposure	Working level 0.004	0.02	0.10	0.5	1.0
7.3×10^{-4}†	1	0.01	0.06	0.3	2	3
	5	0.05	0.3	2	7	14
	10	0.1	0.6	3	14	28
	20	0.2	1	6	28	57
3.0×10^{-4}§	1	0.005	0.02	0.1	0.6	1
	5	0.02	0.1	0.6	3	6
	10	0.05	0.2	1	6	12
	20	0.1	0.5	2	12	23

*Assumption is that residents spend 75% of their time indoors.

†See reference 1.

§See reference 2.

Acute Hepatic Failure After Occupational Exposure to 2-Nitropropane

On June 28, July 1, and July 2, 1985, two construction workers applied an epoxy resin coating to a water main in an underground concrete vault in San Jose, California. Over the 3 work days, the men applied 10 gallons of the resin coating. The vault was unventilated, and the workers used no respiratory or skin protection.

In the evening of July 2, both men went to a local hospital because of persistent nausea, vomiting, weakness, and dizziness. Initial laboratory tests showed slightly elevated serum glutamic-oxaloacetic transaminase (SGOT)—60 units per liter (U/L) for worker 1 and 79 U/L for worker 2 (normal SGOT is less than 40 U/L). The men were admitted for observation and discharged the following day, after their symptoms had subsided.

Three days later, worker 1 returned to the hospital with persistent nausea, vomiting, anorexia, and onset of scleral icterus. Laboratory tests showed marked hepatic dysfunction (SGOT and serum glutamic-pyruvic transaminase [SGPT] greater than 10,000 U/L, and hyperbilirubinemia), severe metabolic acidosis, and renal insufficiency. He was transferred to a university medical center, where his hospital course was marked by gastrointestinal bleeding, arrhythmia, pulmonary edema, and renal failure. He died 9 days after his initial presentation. Autopsy findings were consistent with fulminant hepatic necrosis.

Worker 2 has remained clinically well, although for at least 6 weeks he continued to have elevation of liver enzymes (SGOT and SGPT) in a range of 1.5 to 2 times the normal maximum. Both men had histories of moderate alcohol use (12 cans of beer/week); neither had significant past medical histories, including previous hepatic disease.

According to the manufacturer's labelling information, the coating material contained a mixture of cyclohexanone, toluene, tri(dimethylaminomethyl)phenol, and 2-nitropropane (2-NP), combined with coal tar pitch and epoxy resin. The analysis of leftover compound by the California Department of Health Services confirmed the presence of 2-NP.

The analysis of sera obtained on July 2 showed 13 μg/ml and 8.5 μg/ml of 2-NP for workers 1 and 2, respectively; 2-NP was undetectable in all subsequent samples. No other volatile compounds, including ethanol, were detected in the sera.

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Editorial Note: 2-Nitropropane (2-NP), a nitroparaffin, $CH_3CH(NO_2)CH_3$, is used industrially as a solvent in coatings, printing inks, and adhesives (*1*). In 1977, 15 million pounds of nitroparaffins were used in paint and coatings in the United States, and 2-NP accounted for about 80% (*2*). Estimates by the National Institute for Occupational Safety and Health (NIOSH) indicate that 185,000 U.S. workers are potentially exposed to 2-NP during its production and use (*1*).

At least five occupationally related deaths have resulted from exposure to 2-NP (*3,4*). Typically, workers coated the surface of an enclosed structure (tank, vault, or shiphold), using sealant containing 2-NP. No forced ventilation or personal protection was used. After many hours of exposure, they complained of headache, nausea, vomiting, dyspepsia, and chest pain. A few days later, acute jaundice, hematemesis, enlarged liver, edema, and oliguria/anuria developed, followed by coma and death. One nonfatal case involved a 30-minute exposure to 2-NP vapor caused by a spill (*4*). No estimate concerning the frequency of 2-NP-induced hepatitis is available; however, a review of 62 cases of liver transplant recipients showed that two patients had liver failure secondary to 2-NP exposure (*5*).

Acute Hepatic Failure – Continued

In short-term toxicologic experiments, high concentrations of 2-NP (700 ppm for several hours) have produced parenchymal degeneration and focal necrosis of the liver in experimental animals (*6*). In chronic-exposure studies, 2-NP has produced hepatomas in rats at 207 ppm for 6 months, and it is considered a potential human carcinogen (*7*). Although the current permissible exposure limit as determined by the Occupational Safety and Health Administration (OSHA) is 25 ppm or 90 mg/m^3 (8-hour, time-weighted average), NIOSH has recommended that based on the evidence of animal carcinogenicity, occupational exposure to 2-NP be reduced to the lowest feasible levels (*1*).

The following control measures should be considered for preventing acute toxicity and potential long-term health consequences of 2-NP exposure: (1) paint, sealant, or other coating materials must not be applied in confined spaces without sufficient forced ventilation and respiratory and cutaneous protection, (2) products containing 2-NP should be labelled to reflect its toxicity; workers should be warned that odor does not serve as a warning sign, since toxic levels are below the odor threshold of 83 ppm (*6*), and (3) 2-NP should be replaced whenever

(Continued on page 665)

TABLE I. Summary—cases of specified notifiable diseases, United States

Disease	43rd Week Ending			Cumulative, 43rd Week Ending		
	Oct. 26, 1985	Oct. 27, 1984	Median 1980-1984	Oct. 26, 1985	Oct. 27, 1984	Median 1980-1984
Acquired Immunodeficiency Syndrome (AIDS)	108	97	N	6,568	3,410	N
Aseptic meningitis	295	210	307	8,112	6,722	7,776
Encephalitis: Primary (arthropod-borne & unspec.)	37	48	41	992	973	1,272
Post-infectious	2	2	1	108	102	78
Gonorrhea: Civilian	16,362	18,575	18,575	696,159	695,543	793,712
Military	425	537	520	15,089	17,836	21,984
Hepatitis: Type A	550	493	535	18,579	17,572	18,823
Type B	561	543	453	21,491	21,290	17,843
Non A, Non B	77	73	N	3,377	3,116	N
Unspecified	126	84	161	4,742	4,190	7,164
Legionellosis	12	22	N	530	554	N
Leprosy	2	6	4	287	194	194
Malaria	18	16	16	847	791	907
Measles: Total*	7	41	28	2,564	2,426	2,426
Indigenous	6	38	N	2,130	2,144	N
Imported	1	3	N	434	282	N
Meningococcal infections: Total	33	43	44	1,952	2,251	2,264
Civilian	33	43	44	1,949	2,247	2,249
Military	-	-	-	3	4	14
Mumps	46	49	59	2,451	2,469	3,656
Pertussis	120	30	30	2,601	1,995	1,422
Rubella (German measles)	4	12	15	571	652	1,865
Syphilis (Primary & Secondary): Civilian	436	548	675	21,125	23,083	25,464
Military	1	2	9	122	251	325
Toxic Shock syndrome	3	9	N	294	405	N
Tuberculosis	451	448	497	17,567	17,621	20,981
Tularemia	6	1	3	143	260	231
Typhoid fever	3	4	9	305	299	395
Typhus fever, tick-borne (RMSF)	10	6	8	638	777	1,063
Rabies, animal	108	114	115	4,424	4,543	5,291

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1985		Cum. 1985
Anthrax	-	Leptospirosis (Mo. 1, Tex. 1)	31
Botulism: Foodborne (Oreg. 1, Calif. 1)	42	Plague	13
Infant	47	Poliomyelitis: Total	5
Other	1	Paralytic	5
Brucellosis (N.C. 1, Miss. 1, Tex. 2)	115	Psittacosis (Mich. 1, N.Mex. 1)	90
Cholera	3	Rabies, human	1
Congenital rubella syndrome	-	Tetanus (Md. 1, Tex. 1)	56
Congenital syphilis, ages < 1 year	111	Trichinosis	51
Diphtheria	1	Typhus fever, flea-borne (endemic, murine)	20

*There were no cases of internationally imported measles reported for this week.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending October 26, 1985 and October 27, 1984 (43rd Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1985	1985	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1984	1985	1985	1985	1985	1985	Cum. 1985
UNITED STATES	6,568	295	992	106	696,159	695,543	550	561	77	126	12	287
NEW ENGLAND	221	24	27	-	18,792	19,054	7	58	3	12	1	6
Maine	10	1	-	-	963	834	-	-	-	-	-	-
N.H.	1	2	7	-	472	590	-	-	-	-	-	-
Vt.	2	1	-	-	274	311	1	-	-	-	-	-
Mass.	132	8	16	-	7,667	8,163	2	39	2	11	1	6
R.I.	12	2	-	-	1,497	1,347	1	5	-	-	-	-
Conn.	64	10	4	-	7,919	7,809	3	14	1	1	-	-
MID ATLANTIC	2,612	47	127	11	105,642	93,272	44	37	8	-	-	33
Upstate N.Y.	294	21	40	4	14,582	14,729	27	9	5	-	-	1
N.Y. City	1,774	12	14	-	51,636	37,289	1	-	-	-	-	28
N.J.	392	-	26	-	16,104	16,384	5	17	-	-	-	-
Pa.	152	14	47	7	23,320	24,870	11	11	3	-	-	4
E.N. CENTRAL	278	46	271	20	97,403	98,431	15	30	2	5	3	21
Ohio	45	19	126	4	26,158	25,848	4	9	-	2	-	3
Ind.	23	3	61	2	10,378	10,892	-	3	-	1	-	-
Ill.	146	-	14	8	23,532	22,013	3	1	-	-	-	16
Mich.	46	24	51	-	27,840	28,785	8	17	2	2	3	2
Wis.	18	-	19	6	9,495	10,893	-	-	-	-	-	-
W.N. CENTRAL	86	25	69	4	34,289	34,117	16	21	4	2	3	2
Minn.	27	18	32	1	5,137	5,170	1	4	1	-	-	1
Iowa	10	1	26	-	3,631	3,701	-	4	-	-	1	-
Mo.	37	5	-	-	16,593	16,225	1	9	1	1	1	1
N. Dak.	-	-	-	1	236	326	-	-	-	-	-	-
S. Dak.	1	-	-	-	659	807	12	2	-	-	1	-
Nebr.	3	-	5	-	2,859	2,502	1	-	1	-	-	-
Kans.	8	1	6	2	5,174	5,386	1	2	1	1	-	-
S. ATLANTIC	989	85	114	41	154,402	176,751	47	175	14	12	3	7
Del.	10	5	6	-	3,649	3,251	1	1	-	-	-	-
Md.	118	6	26	1	24,164	20,456	6	34	2	1	1	1
D.C.	144	-	-	-	12,904	12,670	2	-	-	-	-	-
Va.	83	25	25	6	16,110	16,709	4	9	3	1	1	-
W. Va.	5	1	26	-	2,201	2,187	1	11	-	-	-	-
N.C.	50	7	26	1	30,318	28,741	4	24	3	1	-	2
S.C.	24	1	5	-	18,315	17,774	2	9	-	-	-	-
Ga.	140	6	-	-	-	32,505	5	43	-	2	-	1
Fla.	415	34	-	33	46,741	42,458	22	44	6	7	1	3
E.S. CENTRAL	59	8	33	4	63,177	62,682	5	31	1	4	-	-
Ky.	15	1	14	-	7,237	7,477	-	-	-	-	-	-
Tenn.	15	5	6	-	24,200	25,430	3	19	1	3	-	-
Ala.	23	-	11	4	18,891	19,319	-	4	-	-	-	-
Miss.	6	2	2	-	12,849	10,456	2	8	-	1	-	-
W.S. CENTRAL	474	17	118	2	92,770	94,339	59	42	5	30	1	19
Ark.	6	-	3	1	8,994	8,755	-	3	-	-	-	1
La.	79	U	7	-	17,344	20,828	U	U	U	U	U	1
Okla.	15	2	23	1	10,246	10,353	13	2	1	1	-	-
Tex.	374	15	85	-	56,186	54,403	46	37	4	29	1	17
MOUNTAIN	123	13	40	6	23,022	22,886	58	31	6	10	-	7
Mont.	1	-	-	-	610	901	-	-	-	-	-	-
Idaho	-	-	-	-	782	1,096	1	1	-	-	-	-
Wyo.	-	-	1	-	531	618	-	-	-	-	-	-
Colo.	45	4	6	2	6,681	6,546	8	7	-	5	-	2
N. Mex.	12	1	3	-	2,632	2,766	8	1	1	-	-	-
Ariz.	43	5	17	-	8,891	6,299	23	13	3	-	-	1
Utah	13	2	10	4	1,097	1,088	4	4	2	-	-	3
Nev.	9	1	3	-	3,798	3,572	14	5	-	5	-	1
PACIFIC	1,726	30	193	18	106,662	94,011	299	136	34	51	1	192
Wash.	93	3	13	1	8,087	7,131	5	-	3	1	-	34
Oreg.	28	-	1	-	5,378	5,479	65	6	2	-	-	3
Calif.	1,584	27	146	17	89,200	77,457	219	128	29	50	1	135
Alaska	3	-	33	-	2,555	2,345	-	-	-	-	-	-
Hawaii	18	-	-	-	1,442	1,599	10	2	-	-	-	20
Guam	1	U	-	-	128	196	U	U	U	U	U	3
P.R.	70	5	5	2	2,631	2,793	-	2	1	1	-	2
V.I.	2	-	-	-	353	444	-	-	-	-	-	-
Pac. Trust Terr.	-	U	-	-	146	-	U	U	U	U	U	20

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 26, 1985 and October 27, 1984 (43rd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1985	1985	Cum. 1985	1985	Cum. 1985	Cum. 1984	Cum. 1985	1985	Cum. 1985	1985	Cum. 1985	Cum. 1984	1985	Cum. 1985	Cum. 1984
UNITED STATES	847	6	2,130	1	434	2,426	1,952	48	2,451	120	2,601	1,995	4	571	652
NEW ENGLAND	50	-	38	-	88	106	88	1	58	1	187	58	-	12	18
Maine	4	-	-	-	1	-	3	-	6	-	13	2	-	-	1
N.H.	4	-	-	-	-	36	14	-	10	-	103	9	-	2	1
Vt.	1	-	-	-	-	7	10	-	3	-	3	23	-	-	-
Mass.	25	-	34	-	84	49	15	1	17	1	45	15	-	6	16
R.I.	6	-	-	-	-	-	14	-	15	-	16	3	-	-	-
Conn.	10	-	4	-	3	14	32	-	7	-	7	4	-	4	-
MID ATLANTIC	136	-	178	-	38	155	343	6	279	8	167	174	-	220	221
Upstate N.Y.	47	-	72	-	13	36	132	3	150	2	77	96	-	17	99
N.Y. City	51	-	58	-	12	107	60	-	32	-	21	7	-	180	103
N.J.	14	-	17	-	10	7	52	3	38	1	11	13	-	9	18
Pa.	24	-	31	-	3	5	99	-	59	5	58	58	-	14	1
E.N. CENTRAL	53	-	435	-	90	696	338	5	870	4	537	468	1	30	88
Ohio	8	-	-	-	54	9	108	-	257	-	89	70	-	-	2
Ind.	4	-	55	-	2	3	43	-	37	-	174	229	-	1	5
Ill.	19	-	286	-	10	180	78	-	188	4	37	26	1	13	53
Mich.	16	-	37	-	23	464	81	5	306	-	44	28	-	15	20
Wis.	6	-	57	-	1	40	28	-	82	-	193	115	-	1	8
W.N. CENTRAL	29	-	1	-	10	56	97	1	74	26	208	119	-	19	39
Minn.	13	-	-	-	6	47	25	-	1	22	104	15	-	2	4
Iowa	2	-	-	-	-	-	9	1	14	-	28	12	-	1	1
Mo.	5	-	-	-	2	4	39	-	12	-	28	20	-	7	-
N. Dak.	2	-	-	-	2	-	4	-	4	-	9	-	-	2	3
S. Dak.	1	-	-	-	-	-	3	-	-	-	3	9	-	-	-
Nebr.	1	-	-	-	-	-	8	-	3	-	8	11	-	-	-
Kans.	5	-	1	-	-	5	9	-	40	4	28	52	-	7	31
S. ATLANTIC	102	3	275	-	30	64	380	9	234	7	360	201	-	55	24
Del.	-	-	-	-	-	-	10	-	1	-	1	2	-	1	-
Md.	24	3	101	-	9	22	53	4	32	-	151	60	-	6	1
D.C.	8	-	9	-	1	8	6	-	-	-	1	-	-	-	-
Va.	20	-	21	-	7	5	47	-	43	-	17	19	-	2	-
W. Va.	2	-	31	-	2	-	8	1	65	-	4	11	-	9	-
N.C.	9	-	9	-	-	-	52	1	15	3	30	32	-	1	-
S.C.	-	-	-	-	3	1	34	2	11	-	2	2	-	3	-
Ga.	9	-	8	-	-	1	64	-	28	2	92	17	-	4	2
Fla.	30	-	96	-	8	27	106	1	39	2	62	58	-	29	21
E.S. CENTRAL	11	-	-	-	7	6	90	1	29	-	50	14	-	3	12
Ky.	4	-	-	-	5	1	9	-	8	-	8	2	-	3	6
Tenn.	-	-	-	-	1	2	34	1	17	-	20	7	-	-	-
Ala.	6	-	-	-	-	3	26	-	1	-	18	1	-	-	3
Miss.	1	-	-	-	1	-	21	-	3	-	4	4	-	-	3
W.S. CENTRAL	79	-	418	1	16	565	164	12	289	54	477	298	1	37	54
Ark.	3	-	-	-	-	8	15	-	6	-	14	19	-	1	3
La.	1	U	42	U	-	8	23	U	2	U	13	8	U	-	-
Okla.	4	-	-	-	1	8	30	N	N	5	154	240	-	1	-
Tex.	71	-	376	1§	15	541	96	12	281	49	296	31	1	35	51
MOUNTAIN	45	-	497	-	51	145	83	6	229	6	195	111	-	5	21
Mont.	-	-	122	-	17	-	6	-	11	-	9	19	-	-	-
Idaho	2	-	126	-	18	23	3	-	9	-	7	7	-	1	1
Wyo.	1	-	5	-	-	-	6	-	2	-	-	6	-	-	2
Colo.	14	-	6	-	7	6	22	2	23	3	77	39	-	-	2
N. Mex.	14	-	1	-	5	88	10	N	N	-	12	8	-	2	1
Ariz.	9	-	237	-	4	1	21	2	113	-	38	23	-	1	4
Utah	2	-	-	-	-	27	9	-	6	3	52	7	-	-	7
Nev.	3	-	-	-	-	-	6	2	65	-	-	2	-	1	4
PACIFIC	342	3	288	-	104	633	369	5	409	14	420	554	2	190	175
Wash.	23	2	79	-	39	154	62	-	34	3	74	313	-	14	1
Oreg.	12	-	4	-	1	-	33	N	N	1	44	29	-	1	2
Calif.	288	1	187	-	59	316	261	5	348	9	255	136	2	132	166
Alaska	2	-	-	-	-	-	9	-	9	1	30	1	-	1	1
Hawaii	17	-	18	-	5	163	4	-	18	-	17	75	-	42	5
Guam	1	U	10	U	1	90	-	U	5	U	-	-	U	2	4
P.R.	-	-	63	-	-	16	12	-	139	-	11	1	-	27	14
V.I.	-	-	4	-	6	-	-	-	3	-	-	-	-	-	-
Pac. Trust Terr.	-	U	-	U	-	-	-	U	3	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 26, 1985 and October 27, 1984 (43rd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1985	Cum. 1984	1985	Cum. 1985	Cum. 1984	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1985
UNITED STATES	21,125	23,083	3	17,567	17,621	143	305	638	4,424
NEW ENGLAND	487	446	-	608	531	3	12	8	20
Maine	13	7	-	39	24	-	-	-	-
N.H.	36	13	-	16	25	-	-	1	1
Vt.	5	1	-	7	7	-	-	-	1
Mass.	243	257	-	366	294	3	9	6	11
R.I.	14	18	-	47	44	-	-	1	-
Conn.	176	150	-	133	137	-	3	-	7
MID ATLANTIC	2,974	3,103	-	3,149	3,176	2	46	34	492
Upstate N.Y.	228	280	-	546	499	-	12	9	115
N.Y. City	1,801	1,897	-	1,527	1,286	1	24	5	-
N.J.	579	540	-	422	704	1	9	4	39
Pa.	366	386	-	654	687	-	1	16	338
E.N. CENTRAL	849	1,100	-	2,161	2,294	2	36	39	162
Ohio	128	199	-	365	412	-	10	27	27
Ind.	71	119	-	266	269	-	3	4	22
Ill.	400	400	-	952	957	1	14	6	36
Mich.	194	317	-	459	514	-	7	2	25
Wis.	56	65	-	119	142	1	2	-	52
W.N. CENTRAL	196	317	-	493	536	43	13	42	798
Minn.	39	84	-	107	89	1	6	-	161
Iowa	18	11	-	49	55	-	3	1	134
Mo.	106	157	-	233	266	28	3	8	46
N. Dak.	2	9	-	9	12	-	-	1	121
S. Dak.	6	-	-	27	21	8	-	2	259
Nebr.	6	15	-	12	29	2	1	3	33
Kans.	19	41	-	56	64	4	-	27	44
S. ATLANTIC	5,261	6,765	1	3,582	3,680	6	34	301	1,132
Del.	34	18	-	37	47	1	-	3	1
Md.	364	421	-	324	349	-	11	26	562
D.C.	282	271	-	133	144	-	-	-	-
Va.	250	351	-	338	367	1	3	23	159
W. Va.	21	16	1	95	117	-	1	1	26
N.C.	580	702	-	456	553	4	4	126	11
S.	678	645	-	441	439	-	1	69	60
Ga.	-	1,159	-	596	572	-	3	46	176
Fla.	3,052	3,182	-	1,162	1,092	-	11	7	137
E.S. CENTRAL	1,853	1,648	-	1,526	1,655	8	5	71	218
Ky.	57	87	-	368	380	-	1	11	31
Tenn.	528	426	-	447	486	6	2	32	64
Ala.	560	549	-	458	495	1	2	14	117
Miss.	708	586	-	253	294	1	-	14	6
W.S. CENTRAL	5,123	5,661	-	2,249	2,086	55	26	126	725
Ark.	284	184	-	260	235	33	-	16	118
La.	875	1,030	U	321	299	-	-	2	17
Okla.	156	181	-	215	198	16	2	87	95
Tex.	3,808	4,266	-	1,453	1,354	6	24	21	495
MOUNTAIN	583	524	1	453	476	15	11	14	370
Mont.	6	3	-	46	17	4	-	6	180
Idaho	5	21	1	22	27	-	-	-	10
Wyo.	8	7	-	5	1	-	-	4	18
Colo.	148	141	-	55	55	2	4	2	24
N. Mex.	112	77	-	73	90	2	4	-	11
Ariz.	259	177	-	212	222	4	3	-	112
Utah	8	18	-	12	33	3	-	-	4
Nev.	37	80	-	28	31	-	-	2	11
PACIFIC	3,799	3,519	1	3,346	3,187	9	122	3	507
Wash.	80	133	-	203	166	-	1	-	4
Oreg.	86	97	-	108	128	1	5	-	4
Calif.	3,576	3,219	1	2,790	2,646	4	110	3	496
Alaska	4	6	-	90	64	4	2	-	3
Hawaii	53	64	-	155	183	-	4	-	-
Guam	2	-	U	30	45	-	-	-	-
P.R.	705	664	-	295	316	-	2	-	32
V.I.	3	9	-	1	4	-	52	-	-
Pac. Trust Terr.	13	-	U	16	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending October 26, 1985 (43rd Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	708	483	146	44	20	15	57
Boston, Mass.	188	112	48	15	5	8	21
Bridgeport, Conn.	46	35	8	3	-	-	4
Cambridge, Mass.	32	25	7	-	-	-	7
Fall River, Mass.	28	20	4	3	1	-	-
Hartford, Conn.	65	45	11	6	1	2	3
Lowell, Mass.	33	22	6	4	-	1	5
Lynn, Mass.	21	14	6	-	1	-	-
New Bedford, Mass.	20	17	3	-	-	-	-
New Haven, Conn.	53	31	11	6	4	1	1
Providence, R.I.	60	47	10	1	1	1	5
Somerville, Mass.	5	4	1	-	-	-	1
Springfield, Mass.	56	36	15	1	2	2	1
Waterbury, Conn.	39	28	4	3	4	-	4
Worcester, Mass.	62	47	12	2	1	-	5
MID ATLANTIC	2,766	1,835	581	236	54	60	111
Albany, N.Y.	55	43	6	1	1	4	1
Allentown, Pa.	17	8	7	2	-	-	-
Buffalo, N.Y.	125	91	27	3	1	3	12
Camden, N.J.	44	28	9	5	-	2	1
Elizabeth, N.J.	36	24	9	3	-	-	-
Erie, Pa.†	25	19	6	-	-	-	1
Jersey City, N.J.	40	24	9	5	2	-	2
N.Y. City, N.Y.	1,436	956	283	145	27	25	40
Newark, N.J.	76	30	24	13	2	7	2
Paterson, N.J.	28	19	6	3	-	-	1
Philadelphia, Pa.	404	260	86	39	9	10	26
Pittsburgh, Pa.†	86	59	21	3	3	-	1
Reading, Pa.	30	25	2	2	1	-	-
Rochester, N.Y.	129	88	31	3	2	5	10
Schenectady, N.Y.	18	16	2	-	-	-	1
Scranton, Pa.†	36	21	13	1	1	-	3
Syracuse, N.Y.	95	72	14	3	3	3	3
Trenton, N.J.	41	22	16	2	-	1	1
Utica, N.Y.	15	11	2	1	1	-	2
Yonkers, N.Y.	30	19	8	2	1	-	4
E.N. CENTRAL	2,394	1,701	378	141	63	110	99
Akron, Ohio	80	51	17	5	2	5	3
Canton, Ohio	28	22	3	-	1	2	2
Chicago, Ill.§	553	462	11	26	16	37	16
Cincinnati, Ohio	103	69	24	6	2	2	11
Cleveland, Ohio	156	100	40	7	5	4	3
Columbus, Ohio	125	76	28	11	4	6	5
Dayton, Ohio	122	83	25	7	1	6	5
Detroit, Mich.	308	191	58	34	13	12	2
Evansville, Ind.	53	38	11	-	1	3	-
Fort Wayne, Ind.	72	55	8	8	-	1	6
Gary, Ind.	21	12	4	2	2	1	1
Grand Rapids, Mich.	69	50	11	2	2	4	2
Indianapolis, Ind.	170	109	38	9	6	8	3
Madison, Wis.	41	27	6	3	3	2	7
Milwaukee, Wis.	145	106	27	7	-	5	9
Peoria, Ill.	57	39	11	3	-	4	5
Rockford, Ill.	37	29	2	3	2	1	3
South Bend, Ind.	55	42	9	-	2	2	4
Toledo, Ohio	134	94	31	3	1	5	9
Youngstown, Ohio	65	46	14	5	-	-	3
W.N. CENTRAL	791	539	161	46	17	27	40
Des Moines, Iowa	80	59	15	2	1	2	5
Duluth, Minn.	27	16	9	1	-	1	2
Kansas City, Kans.	38	24	7	4	1	2	2
Kansas City, Mo.	107	59	29	12	4	3	8
Lincoln, Nebr.	40	28	8	3	-	3	4
Minneapolis, Minn.	89	65	18	5	2	1	4
Omaha, Nebr.	106	79	17	5	2	3	7
St. Louis, Mo.	158	114	27	7	4	6	3
St. Paul, Minn.	77	59	11	5	-	2	4
Wichita, Kans.	69	36	24	2	3	4	1
S. ATLANTIC	1,136	699	273	86	46	32	43
Atlanta, Ga.	124	77	31	12	1	3	4
Baltimore, Md.	216	132	59	15	7	3	4
Charlotte, N.C.	57	33	16	2	3	3	5
Jacksonville, Fla.	92	63	18	3	8	-	2
Miami, Fla.	95	64	15	10	3	3	4
Norfolk, Va.	61	33	16	5	2	5	7
Richmond, Va.	76	42	17	11	4	2	-
Savannah, Ga.	55	31	18	2	3	1	3
St. Petersburg, Fla.	72	61	8	2	1	-	4
Tampa, Fla.	74	46	12	8	7	1	5
Washington, D.C.	175	87	54	16	7	11	5
Wilmington, Del.	39	30	9	-	-	-	-
E.S. CENTRAL	697	438	157	57	29	15	24
Birmingham, Ala.	125	74	25	14	7	5	1
Chattanooga, Tenn.	53	34	15	4	-	-	1
Knoxville, Tenn.	72	40	21	5	6	-	3
Louisville, Ky.	96	60	17	9	6	4	2
Memphis, Tenn.	100	67	25	5	2	-	7
Mobile, Ala.	81	50	19	4	2	6	4
Montgomery, Ala.	51	37	9	4	1	-	2
Nashville, Tenn.	119	76	26	12	5	-	4
W.S. CENTRAL	1,381	791	336	146	62	46	40
Austin, Tex.	34	19	6	5	4	-	1
Baton Rouge, La.	34	23	5	5	-	1	1
Corpus Christi, Tex.	43	26	11	2	2	2	2
Dallas, Tex.	199	102	55	28	7	7	3
El Paso, Tex.	53	39	8	4	2	-	6
Fort Worth, Tex.	100	70	15	6	4	5	4
Houston, Tex.	425	215	126	49	20	15	6
Little Rock, Ark.	66	39	21	4	2	-	4
New Orleans, La.	110	50	21	22	16	1	1
San Antonio, Tex.	167	101	40	16	3	7	6
Shreveport, La.	67	45	16	3	-	3	3
Tulsa, Okla.	83	62	12	2	2	5	3
MOUNTAIN	628	409	125	49	22	22	37
Albuquerque, N.Mex.	96	63	15	11	5	1	4
Colo. Springs, Colo.	23	13	3	4	2	1	3
Denver, Colo.	110	69	21	10	2	8	7
Las Vegas, Nev.	92	60	23	6	2	1	6
Ogden, Utah	18	13	4	1	-	-	2
Phoenix, Ariz.	117	77	24	4	5	7	1
Pueblo, Colo.	24	17	4	1	-	2	5
Salt Lake City, Utah	47	29	6	7	4	1	-
Tucson, Ariz.	101	68	25	5	2	1	9
PACIFIC	1,825	1,208	351	141	65	57	86
Berkeley, Calif.	22	11	6	4	-	1	-
Fresno, Calif.	80	52	14	10	3	1	8
Glendale, Calif.	25	20	2	3	-	-	-
Honolulu, Hawaii	76	47	17	6	2	4	9
Long Beach, Calif.	53	34	9	2	4	4	7
Los Angeles, Calif.	485	299	107	42	26	8	10
Oakland, Calif.	73	47	16	3	2	5	3
Pasadena, Calif.	27	21	4	-	-	2	1
Portland, Oreg.	129	92	16	11	9	1	1
Sacramento, Calif.	153	111	31	10	-	1	11
San Diego, Calif.	145	89	30	13	5	8	5
San Francisco, Calif.	135	86	31	13	3	2	3
San Jose, Calif.	187	131	27	11	6	12	15
Seattle, Wash.	144	96	27	9	5	7	5
Spokane, Wash.	50	39	8	2	-	1	6
Tacoma, Wash.	41	33	6	2	-	-	2
TOTAL	12,326	8,103	2,508	948	378	384	537

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza.

† Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Acute Hepatic Failure — Continued

possible by other less toxic solvents in paint and coating formulations. Reportedly, 2-NP has been replaced by 1-NP in many paint formulations (*2*). However, since these two chemicals have very similar characteristics, the same precautions should be taken in handling them.

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International Notes

Rapid Nutritional and Health Assessment of the Population Affected by Drought-Associated Famine — Chad

Chad, a landlocked country of approximately 4.5 million people, was one of the countries most severely affected by sub-Saharan Africa's recent drought and associated famine. The drought caused many Chadians to leave their villages. Some voluntarily resettled in food-for-work settlements along dried-up river beds; others moved to makeshift encampments near towns and villages. Food aid and health care for the majority of these displaced persons was limited. The U.S. Agency for International Development (AID), with the concurrence of the Government of Chad, asked CDC to provide a team to conduct a rapid assessment of the health and nutritional status of the displaced population. This assessment was performed in January 1985, with the cooperation of AID, the Chadian Ministry of Health, Médecins Sans Frontières (MSF), and other private voluntary agencies.

Seven sites were assessed in seven of the country's 14 prefectures. The sites included a variety of displaced-person settlements, food-for-work programs, and unstructured population concentrations around villages, but these sites were not randomly chosen. At each site, the nutritional status of a random sample of children 1-5 years of age was assessed by anthropometric methods. Except at two sites, where weight-for-height surveys had been conducted by MSF, the mid-upper arm circumference method was used. Recent measles occurrence and measles vaccination coverage at each site were determined, along with the estimated incidence of recent diarrhea. Diarrhea treatment methods also were determined. Respondents were asked about recent malaria or unexplained fever, and water availability and sanitation needs were assessed.

Drought-Associated Famine — Continued

Levels of acute undernutrition (less than 80% of median weight-for-height or mid-upper arm circumference under 12.5 cm) ranged from 8% in an established resettlement site to 67% in an unorganized camp where only minimal food aid had been given (Tables 2 and 3). Levels of severe undernutrition (less than 70% of median weight-for-height or less than 11.1 cm arm circumference) ranged from 0 to 18% among children in the various sites (*1*).

Measles had occurred in many sites. At the time of the survey, immunization campaigns had been conducted in only a few of the larger camps. In the rest of the country, vaccination coverage was estimated to be less than 5%. Water quality and quantity in most sites were poor. Diarrhea was prevalent. Little malaria-like disease was reported. In one area where mortality had been determined by another voluntary agency, the rate was at least three times the normal level of 20 deaths per 1,000 population per year.

In addition to anthropometric studies, MSF conducted nutritional status assessments in 45 areas that had an estimated population of 300,000. This assessment was based on socioeconomic factors, including migration, family composition, and food supplies and on whether traditional famine foods, such as leaves and roots, were being consumed. The results correlated with nutritional data that MSF collected later in several of the areas. The MSF studies indicated that less than 3% of the population lived in areas with adequate food reserves, 45% lived in areas with a potential for deterioration over the next few months, and 53% lived in areas with serious current nutritional problems.

Reported by the Government of Chad; US Agency for International Development, Ndjamena, Chad; Médecins Sans Frontières, Chad; Africa Bureau/Regional Affairs, Africa Bureau/Technical Resources/Health and Nutrition, Office of Foreign Disaster Assistance, Agency for International Development, Washington,

TABLE 2. Nutritional status* of children 1-5 years of age at selected sites, determined by weight-for-height anthropometric method — Chad, 1985

Location	No.	Percent < 80% median wt.-for-ht.	Percent < 70% median wt.-for-ht.
Ati	317	25.8	5.6
Niergui	†	56.0	†

*Measurements done by Médecins Sans Frontières.
†Not available.

TABLE 3. Nutritional status* of children 1-5 years of age at selected sites, determined by mid-upper arm circumference (AC) anthropometric method — Chad, 1985

Location	No.	Percent < 12.5 cm AC†	Percent < 11.1 cm AC§
Baltram	23	8.3	0
Sidje	85	20.0	2.4
Mousarak	100	35.0	6.0
Mousragi	102	42.0	10.0
Am-Timan	100	67.3	17.8

*Measurements done by CDC team.
†Corresponds approximately with less than 80% of median weight-for-height (Table 2).
§Corresponds approximately with less than 70% of median weight-for-height (Table 2).

Drought-Associated Famine — Continued

DC; Div of Field Svcs, Epidemiology Program Office, Div of Nutrition, Center for Health Promotion and Education, International Health Program Office, CDC.

Editorial Note: The major health problem observed was the poor nutritional status of the Chadian population. The levels of malnutrition were as high as or higher than those seen in the Sahel during the 1969-1974 drought (*2,3*). It appeared that if the food assistance were not increased, widespread mortality could result. Based on MSF observations of areas in need, the CDC team estimated that the minimum aid needed per month was 17,000 tons of food; this amount considerably exceeded the existing delivery capacity of 10,000 tons per month and was more than double the amount then being provided.

Efforts were successful in increasing the delivery of food through ports in Nigeria and Cameroon and in augmenting the distribution capacity within Chad. New food-for-work settlement projects were temporarily suspended until the already displaced population could be partially rehabilitated nutritionally. Supplementary feeding programs run by voluntary agencies were expanded.

Measles is a serious threat to malnourished populations; low vaccination coverage levels among children in the displaced population constitute a major risk. Efforts were undertaken to increase vaccination coverage of this highly vulnerable population, such as mass immunizations in several of the larger camps.

Recommendations were presented to improve the water situation by using simple technology to build shallow wells in areas with superficial water tables. Oral rehydration was well accepted by the local population, where introduced, and attempts were made to augment local supplies and use.

Malaria did not appear to be a problem at the time of the assessment; however, many areas of the country are malarious at least seasonally. With the beginning of the rains this year, the disease may pose a significant threat to those whose immunity has waned during the drought and to those who have migrated from nonmalarious areas. Adequate supplies of chloroquine are available in the country.

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Erratum: Vol 34, No. 3S

In the *MMWR* supplement "*Chlamydia trachomatis* Infections: Policy Guidelines for Prevention and Control," the dosage for doxycycline on page 67S was given incorrectly. The statement should read:

Inpatient Treatment

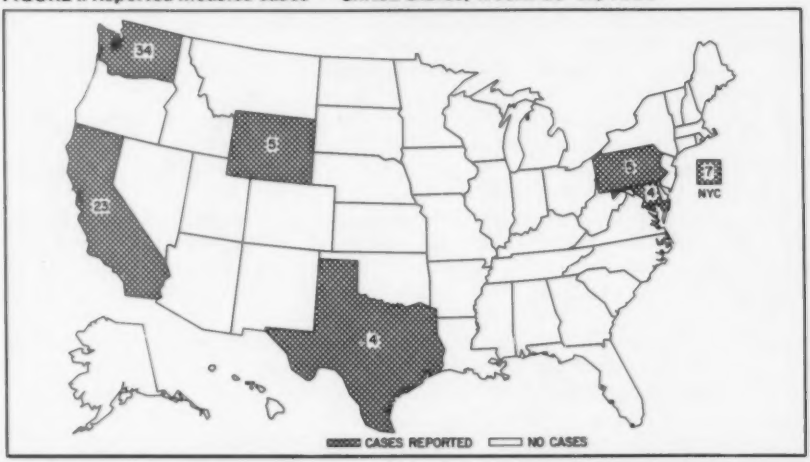
Doxycycline: 100 mg, intravenous (IV), 2 times a day.

PLUS

Cefoxitin: 2.0 g, IV, 4 times a day.

Continue drugs IV for at least 4 days and at least 48 hours after patient improves. Continue doxycycline 100 mg, by mouth, 2 times a day, to complete 10-14 days of therapy.

FIGURE I. Reported measles cases — United States, weeks 39-42, 1985



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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday.

The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

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